

**Iowa Power Fund Board - Due Diligence Committee (DDC)**  
**Meeting Minutes**  
**August 26, 2009**

**Iowa Department of Economic Development**  
**Conference Room**  
**Des Moines, IA**

**Call to Order**

Roya Stanley, Director of the Office of Energy Independence, called the meeting to order at 12:45p.m.

**Roll Call**

| Member                | Present    | Absent |
|-----------------------|------------|--------|
| Franklin Codel        | X          |        |
| Ted Crosbie           | Conf. Call |        |
| Vern Gebhart          |            | X      |
| Patricia Higby        | Conf. Call |        |
| Fred Hubbell          |            | X      |
| William (Curt) Hunter | Conf. Call |        |
| Kevin Nordmeyer       | X          |        |
| Roya Stanley          | X          |        |

Also in attendance from the Office of Energy Independence: Brian Crowe and Mary Lewis.

**Approval of Agenda**

Ms. Stanley asked for a motion to approve the agenda. Mr. Nordmeyer made the motion to approve; Mr. Hunter seconded the motion. The motion passed unanimously.

**Approval of Minutes**

Ms. Stanley asked for a motion to accept the June 24<sup>th</sup> minutes. Mr. Crosbie made a motion to approve; Mr. Hunter seconded the motion. The motion passed unanimously.

**Chair's Remarks**

None

**Full-Application Review**

**09-06-1205      Petroleum Replacement Fuels and Chemicals From Advanced Catalysis**  
**Renewable Energy Group, Inc., Ames, IA**  
**Elevance Renewable Sciences, Inc., Bolingbrook, IL**  
**Requesting    \$3,857,646      Match   \$12,750,948**

Renewable Energy Group and Elevance Renewable Sciences along with new partner Technochem International propose to build a demonstration scale integrated biorefinery to convert renewable raw materials into petroleum replacement fuels and specialty chemicals. The project is replicable and shovel ready. Going forward from the DDC's questions and concerns raised in June, (1) the project has been reworked and the ask has been reduced 20% to \$3.9 million, (2) partner cost share is more than 75% of \$17 million, (3) the project creates value for Iowa agriculture and if successful the Iowa biodiesel industry, and (4) the partners believe IP issues can be resolved based on the precedent set with other Power Fund projects. The partners are committing over 75% of go forward spending over the next two years while 100% of Iowa Power Fund dollars will be spent in Iowa with more than 80% going towards Iowa job creation. With demonstration unit success, project technology could replicate across several biodiesel

facilities in Iowa. Some of the markets that currently use petroleum replacement fuels and chemicals are soy biodiesel, paintballs, personal health and beauty products, paper packages and corrugated coatings, and candles. Markets the partners see opportunities for expansion are advanced biofuels, polishes, anti-microbials, solvent and surfactants, and adhesives.

Q. In terms of the plant you intend to build, what are the energy sources that come into the plant? Are you using natural gas, coal, biomass or some other source to create power?

A. We will use natural gas for the demonstration unit to power the hot oil heater that we'll need. Other than that it's going to be electricity but our energy needs will be much lower than a traditional petroleum facility.

Q. Would there be an opportunity to convert to a renewable energy source.

A. Yes, there could be that possibility in the future.

Q. One biorefinery shut down for being too costly. (1) What would the cost be for retrofits and (2) if you were able to retrofit existing facilities what would the cost division be relative to the old technology and (3) does it really resurrect biodiesel in Iowa?

A. (1) A lot depends on location, logistics and existing technology. Some estimates range from \$20 million on the low end to maybe \$75 million on the high end for retrofitting existing biodiesel facilities. (2) Scale makes the difference for the cost. (3) Our technology will continue to produce other products as well as biodiesel.

C. I've appreciated that you've addressed all of the DDC's earlier questions.

Q. Curt – Would applicants take a loan? Would they take less? What's their contingency plan?

A. Our contingency in this case is doing other projects in other locations. With respect to the grant versus loan option, there's certainly a lot to be negotiated in Iowa Power Fund support. We strongly lean towards a grant with repayment provisions in the event of success. If it was loans or nothing, we would be willing to consider it but we would struggle with other opportunities through other avenues.

Q. Do you have research agreements with Iowa State University and the University of Northern Iowa?

A. We do not have those agreements in place currently but we do have ongoing discussions with those groups.

Q. Is there any idea for the full scale project, if the Power Fund invested in the pilot demonstration scale? Is there a commitment to doing the full scale in Iowa?

A. It's too early to determine that at this time. We need the data from the pilot model to know if replication would be possible.

Q. But, if replication was to happen at full scale?

A. We're willing to enter into negotiations on what kind of success payments might make sense back to the Power Fund. I think you've had other structures that are similar in that way and we're willing to enter into those sorts of arrangements.

**Vote:**

**Yes – Crosbie, Nordmeyer, Hunter, Higby**

**Table –**

**No –**

**08-02-1060**

**Adding Value to Biomass Co-Products in the Biorefinery Supply Chain**

**West Central Cooperative, Ralston, IA**

**Requesting \$820,013 Match \$820,012**

West Central Cooperative proposes to create new uses and increase the value of biomass co-products in the renewable fuels industry through the creation of a pilot biorefinery for the research and development of value added products. This project will benefit co-products by narrowing the economic focus to determine commercial feasibility, providing valuable data for new product development, design parameters and product development, minimizing the risk of large amounts of capital being spent on unproven concepts, and becoming an ongoing research and development entity focused on value added products. The four research projects proposed for the pilot biorefinery are: (1) development of a means to increase the value of crude glycerin derived from the production of biodiesel from alternative feedstocks such as animal fat; (2) increasing the energy value of soybean meal by removing raffinose and stachyose with ethanol; (3) increasing the value of ethanol extracted corn germ by making it into a bypass protein; and (4) increasing the value of soybean meal. Applicant is a company with a corporate culture of encouraging and developing value-added agricultural products.

Q. What would the Power Fund be funding?

A. Power Fund dollars would be used for equipment.

Q. What does it mean for your research project #3 if the industry moves aggressively into cellulosic ethanol and not corn based ethanol?

A. We think that corn based ethanol will always be strong in Iowa recognizing that other cellulosic ethanol type processes will be operating. We believe those processes as being a long ways from development and corn will be a significant player for some time to come.

Q. In your last project of creating formaldehyde free particle board, would it truly be formaldehyde free or would there still be a percentage of formaldehyde in it?

A. More than likely it would have a percentage of formaldehyde in it but there will be an overall reduction. We can produce a product that truly is formaldehyde free but I'm not sure if it would meet the specks of today's market.

Q. Are the research projects overlapping or ranked in any particular order? Can they be done independently regarding commercial significance?

A. If you ask me to rank them, I'd say 1, 3, 2 and 4 and I would say that they are not inter-dependent on one another. They could be independently done as well as other projects.

Q. Has the Power Fund funded projects that are like this proposal?

A. We have funded Novecta who have done a study on pelletized animal feed. That was a glycerine study for swine.

Q. According to your application, you'd be willing to accept a loan or other financial vehicle besides a grant?

A. A grant or forgivable loan probably makes the most sense. A loan guarantee probably doesn't create a lot of value for this.

Q. So, does that mean you'd also be ruling out success payments?

A. We would consider those.

Q. The pre-application you submitted was in the first round of Power Fund applications we received but now, nineteen months later there's a full application. Is there a reason that there was the delay in presenting the full application?

A. There is a couple of reasons one being from a technical perspective and that is we've transitioned a couple of folks within our project team. We've also had some recent development from the wood adhesive side as well as bringing in Dupps, the other partner we mentioned in our application.

Q. How will the results of your research be published or be available to others?

A. After proving out a product or process in a pilot scale, we publish that in the journal for the American Dairy Science Association. Prior and after we publish, the work is peer reviewed and replicated. That is the most credible source for the Dairy Industry.

Q. You're supplying the chemicals to the company in Toronto, Canada to produce their agri-boards?

A. We think of it as producing one component of their final product.

Q. For research project 3, what are you going to be doing differently than other researchers?

A. On a product level, we'd be removing the corn germ and focusing on the DDG side because a fair amount of the DDG that comes out of the process is what is called a by-pass protein. If we can stabilize the inconsistency of the levels of that to a consistently reliable protein, we could have a substitute for soy bean meal in an animal's diet.

**Vote:**

**Yes – Codel** – suggest that request funding to 50% of the non-building costs, **Hunter** – want record to show the willingness to work with a forgivable loan with success payments and that the four proposed research projects could be independent from each other and not as a package, **Nordmeyer, Crosbie, Higby**

**Table –**

**No –**

(1:34:10)

08-10-1155

**Hybrid Power Center – Geothermal – Natural Gas Integrated Thermal Cycle**  
**Hybrid Power Centers, LLC, Des Moines, IA**  
**Requesting \$1,000,000 Match \$341,000**

Hybrid Power Centers' proposal is to couple two of more fuel sources into one power plant. Short term answers don't exist for reducing the carbon footprint. Technology currently under development to help become that answer is a hybrid power plant that would combust both coal and biomass in a single integrated system. An advanced technical review analysis has demonstrated that the concept is viable using existing technology, that the unit could meet baseload energy needs at an industrial scale and that it could do so in a cost-efficient, environmentally friendly manner that would return investment to Iowa. Work being done for carbon capture and sequestration (CCS) technology is not commercially available and likely a decade away. Applicant seeks to refine analysis by building one or more hybrid power plants as pilot projects.

Q. Have you investigated DOE funding and what might be available?

A. An RFP is not immediately available.

Q. So conceptionally, after the three year period, you wouldn't have built a facility; you would have the blue prints to build a facility?

A. Yes.

Q. Will this technology go beyond the accepted 20%?

A. 20% is reflective of a coal fired plant operating at 100% which most plants don't do. Most coal plants operate at 75% or less. If we're at 25% at average power, we're already beyond the standard.

Q. There's an old saying "the solution to pollution is dilution." You're talking about efficiency but I'm not convinced that less coal would be consumed.

A. That's true if you look at the fact that you don't have to buy allowances and such for the coal emissions. There's going to be a penalty for every ton of carbon that comes out from coal versus biomass. The emissions from biomass is going to be determined to be a bigenically recycled process so you're not going to have to pay an emission allowance for that.

Q. What did you assume would be the cost per ton for CO<sub>2</sub> emissions?

A. We used the standard assumption price which I think is \$25 per metric ton, \$22.68 per U.S. ton.

Q. So I think what I heard you say is that you would be backing down the use of coal depending on the market and the market price of CO<sub>2</sub> emissions?

A. There are basically two motivators, the first, paying for an allowance for every ton of CO<sub>2</sub> and the second, when you're co-firing anyway, for whatever biomass you burn, the heat output is going to offset the output you're going to have from burning coal.

Q. Looking at the report, you would be looking for additional support for the project? \$150k in the first year, is that correct? And so, from the \$661k you actually only need \$140-\$150k to get the project started?

A. Yes and we have that from Mid-American but we need additional funding to get to where we need to be but we will be going out to look for additional resources.

Q. At the end of the first year, would it be clear the project is a "go or no go"? Or will it likely be in a grey area where we'd have to put more in to find out if the project's going to work?

A. When the Black and Veatch study is done, it will be very clear. It may take more than a year, it may take less than a year but our experience with Black and Veatch is that they take longer than we had thought and longer than they thought.

Q. What is the cost of coal versus the cost of biomass comparisons?

A. Waxman Markey will drive up the cost of coal and that will meet or exceed the cost of biomass per ton.

Q. What is the direction of the price of coal and the speed of acceleration?

A. Because of rail access, it's a different price per ton for each plant.

Q. Under what conditions, either regulatory, legislative, business wise, etcetera, would Mid-American decrease/Increase their commitment to this project?

A. I think that answer's going to stem a lot from what comes out of the Black and Veatch study.

Q. Do you consider that study to be the first 18 months or the total three years?

A. The first 18 months.

Q. So the \$320,000 you've committed, is that full or is that conditional?

A. Part of that is labor and assistance with the study. It's not focused on any particular milestone.

Q. What's the timeline to actually implementing the technology?

A. We're looking at two to four years of study, at the same time working on construction and having a pilot on the ground in five years.

C. Project leaders need to continue to look for more funding.

**Vote:**

**Yes – Codel** – If Power Fund would be equal partners with the Mid-American contribution, **Crosbie, Nordmeyer, Hunter** – only for the same 18 month commitment as Mid-American, **Higby**

**Table –**

**No –**

**09-02-1176R      SynGest BioAmmonia Production from Biomass**  
**SynGest, Inc., Menlo, IA**  
**Requesting      \$2,500,000      Match   \$77,500,000**

SynGest proposes to produce BioAmmonia (anhydrous ammonia) from corn cobs through their project of developing a production facility in Menlo, Iowa. This first commercial scale demonstration facility would enable the establishment of parameters for rapid future expansion and allow establishment of an easily replicable model. The project, in beginning operations, will convert 130,000 tons of corn cobs, purchased from local farmers, into 50,000 tons annually of anhydrous ammonia. This BioAmmonia will be sold to area farmers via an agreement with Heartland Coop. While the technology is not new, creating the process, by using known technology as building blocks, would be the key for both operations expansion and model replicability. More than 55% of all nitrogen fertilizer is currently imported to the U.S and over 75% of the anhydrous ammonia sold is purchased from one of five large corporations. There would be no direct competitor since this would be the first plant of its kind in the world.

Q. Are you using natural gas for energy?

A. No, we will not be using natural gas at all.

Q. And you'll be using cobs to make gas?

A. Yes, it's a Habor-Bausch process.

Q. But it does take a lot of energy for this process?

A. Yes, it will take roughly 150k tons per year of biomass to produce 50k tons per year of ammonia. We will have importable 6MW of soft power.

Q. What is it going to cost per ton to produce this way rather than the old way?

A. Costs would be more reflective of current wholesale cost.

Q. So what is it going to cost, per ton, to make ammonia this way rather than the other way?

A. Our break even is \$300 per ton.

Q. So you believe its cost competitive from the other ammonia?

A. Yes.

Q. Can you really call this an organic material?

A. Yes.

Q. Your cash match is \$1.25 million. Why do you need Power Fund dollars at all?

A. For the endorsement since other stakeholders have made state support a requirement. Being the first dollars in would be huge in order to gain other funds.

Q. What is the exit strategy for this request?

A. A "Google" type of return for the State of Iowa. We would be willing to give back with a reasonable schedule. An Energy type of payback vehicle is on the table.

Q. I see this more as an IDED project more than a Power Fund project.

A. When we looked at the Power Fund mission, it aligns with our project goals.

Q. Your configuration and enhancements are on the R&D level?

A. Yes, that is a fair characterization.

Q. What is the status of IDED? Are they waiting on DOE dollars?

A. IDED has made their funding contingent on DOE funding, as well as other funding. I think their words were "last dollars in".

Q. On page 14, "store in refrigerated tanks at low pressure", will you be using electricity for those tanks and if so, where will you be getting that?

A. It's common technology within the process. We would not be using electric. Ammonia is a natural refrigerant when under pressure.

Q. On page 8, the SynGest market driver. What will happen with the price of BioMass?

A. Analysis shows that it will be more profitable. Producers can bid the price but not bid it out of the market.

**Vote:**

**Yes – Nordmeyer** – contingent on DOE funding, **Crosbie** – suggest a 10% repayment over 10 years at 0% or 20% for five years once the plant is operational, **Codel, Higby, Hunter**

**Table –**

**No –**

**09-06-1207**

**A Bio-refinery to Manufacture High Value Chemicals from Non Food Biomass**

**Sriya Innovations, Inc., Marietta, GA**

**Requesting \$10,000,000 Match \$30,000,000**

Sriya Innovations has developed a novel, integrated and scaleable biorefinery platform to convert widely available cellulosic biomass to sugars, fuels and high value added chemicals. The technology uses a proprietary, patent pending nano catalytic-solov-thermal (NCST) platform for the fractionation and hydrolysis of biomass without the use of harmful solvents, solid catalysts, acids, bases or enzymes to yield cleanly fractionated cellulose fiber, lignin oligomers, and hemicellulose-derived monosaccharides. The applicant proposes to build a commercial facility at the size of 320 tons/day in Iowa. This commercial facility will utilize Sriya's first generation technology producing carbohydrate products that are further upgraded to furfural and glucose, which could be further processed through fermentation into cellulosic ethanol. The lignin could be utilized to produce power for the facility, utilized by others for the same purpose or could be used in animal feed. Applicant is looking for assistance from the Iowa Power Fund to accelerate commercialization of its technology and to its development in Iowa.

Q. How would the Power Fund dollars be used?

A. We want to build a commercial building mostly in equipment, land and the building.

Q. The Power Fund mission doesn't allow the funding for construction and land.

A. We are bringing \$30 million so we could discuss what Power Fund dollars would be allocated towards the project.

Q. So you'd be using your technology to attach to existing ethanol plants?

A. We could do it a number of ways. We could supply them cheap non-food sugars or we could license the technology to them. Anything that is non-fuels, we would do ourselves.

Q. Please talk a bit about your conversion technology. Anything that's not proprietary.

A. Everything's proprietary but basically, we can take any biomass and in a matter of minutes, not days, we can convert that into pure glucose, xylose and lignin and from there make ethanol, furfural or xylitol.

Q. Your application doesn't adequately show me how this nano-technology works.

A. The information is proprietary. If you'd like, you could come to Atlanta and visit our facility or you could read the DOE application.

C. There's no documentation of the claims being made in the full application that's been submitted about the process or the technology. If we have a special session, I want to hear from the chief scientist or an authority from Kleiner Perkins.

C. Bring back a convincing, provable presentation with a reasonable flow of data with a reputable third party vetting.

A. We ask for an open mind, a closed forum and an hour to present.

C. I also request that you include a summary and conclusion for the new presentation.

C. I suggest you also give serious thought about the request amount and how it's portioned to the benefit.

**Vote:**

**Yes –**

**Table – Higby, Crosbie, Hunter, Codel, Nordmeyer**

**No –**

**Other Business**

None

**Next Meeting**

The next Due Diligence meeting will be on October 28<sup>th</sup>. The location and time is TBD.

**Adjournment**

The meeting is adjourned at 4:40p.m.

Respectfully Submitted,  
Mary Lewis, Recorder

DRAFT